



Regulatory Education and Outreach for Distributed Energy

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Office of Distributed Energy Resources

- ⇒ Microturbines, reciprocating engine generator sets, fuel cells
- ⇒ Materials, energy storage, power electronics
- ⇒ Equipment, bldg. and electrical interconnection standards
- ⇒ Communications and control
- ⇒ Combined heat and power (CHP), “power parks,” building cooling, heating & power (BCHP, thermally-activated technologies)

Case Study: Capstone Turbine Corp

- ⇒ 30-kW Microturbine
- ⇒ Natural-gas fired (capable of running on propane, kerosene, landfill gases)
- ⇒ “Benign” emissions signature (low NOx)
- ⇒ Grid-parallel, grid-independent
- ⇒ UL2200 Certification
- ⇒ Certified under NY State Interconnection Guidelines

Case Study – Capstone, cont.

- ⇒ Fargo, ND – Holiday Inn & Conference Center
 - 1 30-kW unit (M330-SA) with Unifin heat recovery system
 - Installed inside bldg., in mechanical room
 - Utilizes “low pressure” natural gas (11 lbs.)
 - No electrical interconnection with grid
 - Feeding all electrical and thermal output directly into boiler

Case Study – Capstone, cont.

Action	Cost (\$000s)
⇒ Upgrade 50 yds. Natural gas pipeline (1 lb. To 11 lbs.)	4.0
⇒ Mechanical inspector required:	
all pipeline connections to be welded	3.0
VF drive for additional combustion air into room	6.0
new chimney to outside	3.0
⇒ Electrical inspector required:	
Grounding only	n/a
⇒ Additional modem phone line	n.a
⇒ Engineering labor and materials	14.0
Total Installation estimate:	30.0

Case Studies – IdaTech, Inc.

- ⇒ 2-5kW PEM fuel cell system and fuel reformer
- ⇒ Utilizing methanol as feedstock on first units
- ⇒ 300-gallon “toad” retrofitted as onsite storage tank, piping system
- ⇒ Relevant code: NFPA 30 and 30A, Combustible Liquid Fuels
- ⇒ BPA has funded 110 alpha and beta units, currently installing first 10 units across Pacific Northwest

Case Studies – IdaTech, cont.

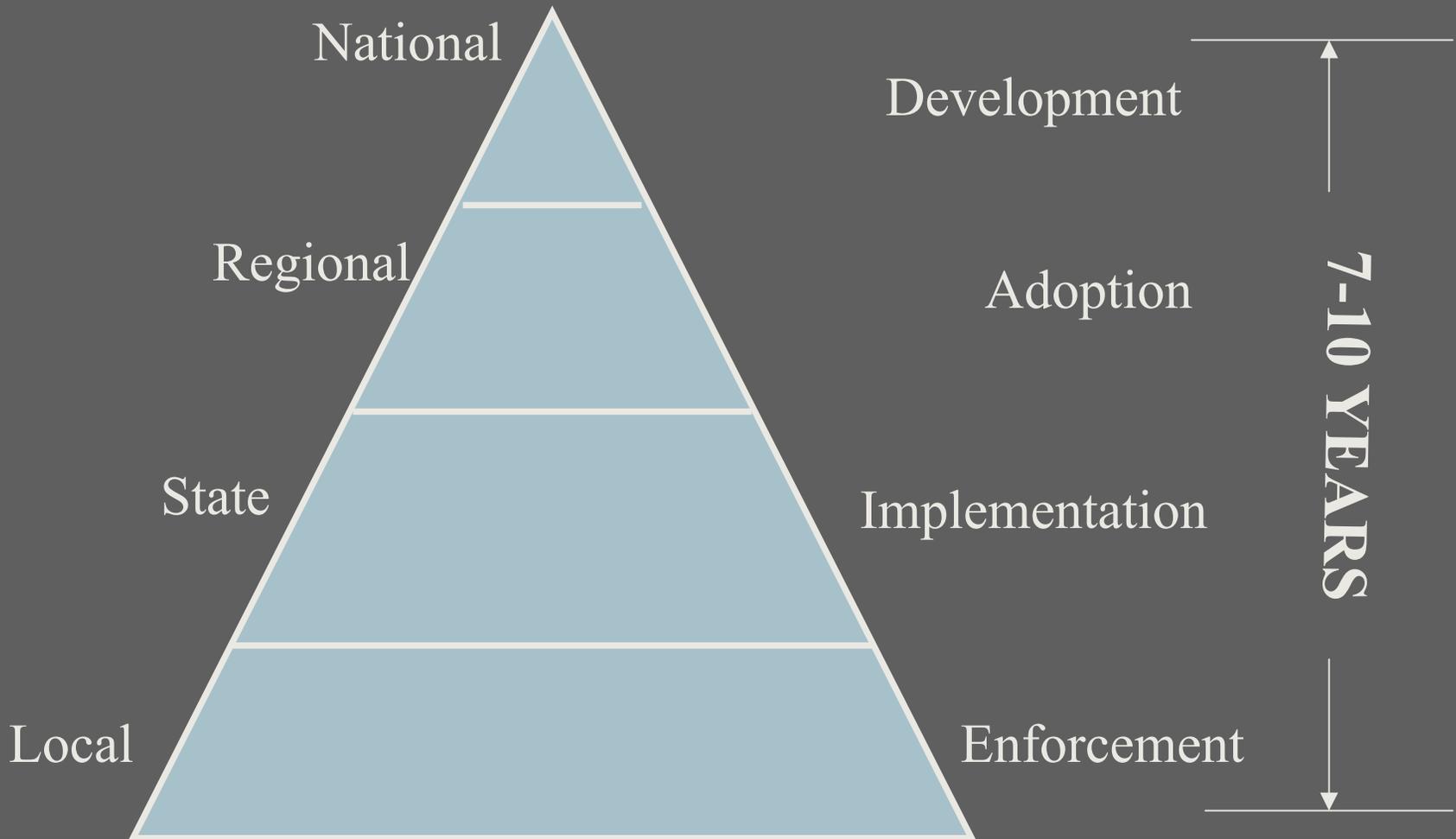
- ⇒ Fire Marshals in urban areas requiring the following on methanol systems:
 - Additional setbacks from walls, doors, windows, public access
 - Automatic shut-off valve during periods of no demand
 - Signage, fire extinguisher
 - Tank must be fenced, protected from vehicular impact
 - All pipes that enter building must be welded; all invisible joints must be welded

Case Studies – IdaTech, cont.

⇒ Methanol fuel system requirements, cont:

- 12-ft. ventilation stack
- Emergency relief venting system – 18-in. manhole w/loose bolts
- Seismic calculations
- Secondary containment system
- Sight glass on storage container
- Static electricity management system – grounded tank, toad, etc.
- Pressure test on all pipes and tanks, with Fire Marshall observing
- Road uneven – must be re-graded

U.S. Standards and Codes Overview



The U.S. Bldg. Code Environment

- ⇒ Numerous voluntary and public sector standards developers
- ⇒ Three developers of model codes merging to develop one model code (ICC)
- ⇒ Federal, state and local government adoption and implementation of voluntary standards
- ⇒ Uniformity is increasing over time

U.S. DOE Support of DER Codes & Standards

⇒ Office of Distributed Energy Resources

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- Microturbines, Debbie Haught, Tel: 202-586-2211
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Activity Updates – Fuel Cells

- ⇒ ANSI Z21.83/CSA 12.10, Fuel Cell Power Plants
- ⇒ ASME PTC 50, Performance Test Code for Fuel Cell Power Plants
- ⇒ IMC
- ⇒ NFPA 70, Article 691/12, Fuel Cell Systems
- ⇒ NFPA 853, Installing Fuel Cells
- ⇒ NES Protocol

Activity Updates - Microturbines

⇒ UL 2200, Installation and Operation of Engine Generator Sets

Paul Orr, Tel: 631-271-6200, x. 22596; paul.orr@us.ul.com

⇒ ASME B 133/ISO TC 192, Gas Turbines

Ryan Crane, Tel: 212-591-7004, craner@asme.org

⇒ EGSA Performance Standard

⇒ UC Irvine and California Energy Commission,
MT Performance testing protocol

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Activity Updates – All DER

⇒ IEEE P1547, Distributed Resources
Interconnected with Electric Power Systems

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⇒ UL 1741, Static Inverters and Charge Controllers

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FERC/NERC Interactions

RTO/ISO Operators

State PUCs, PSCs, Energy Offices

State EPAs

County Zoning and Planning Officials

**Municipal Building Code Authorities,
Fire Marshals**

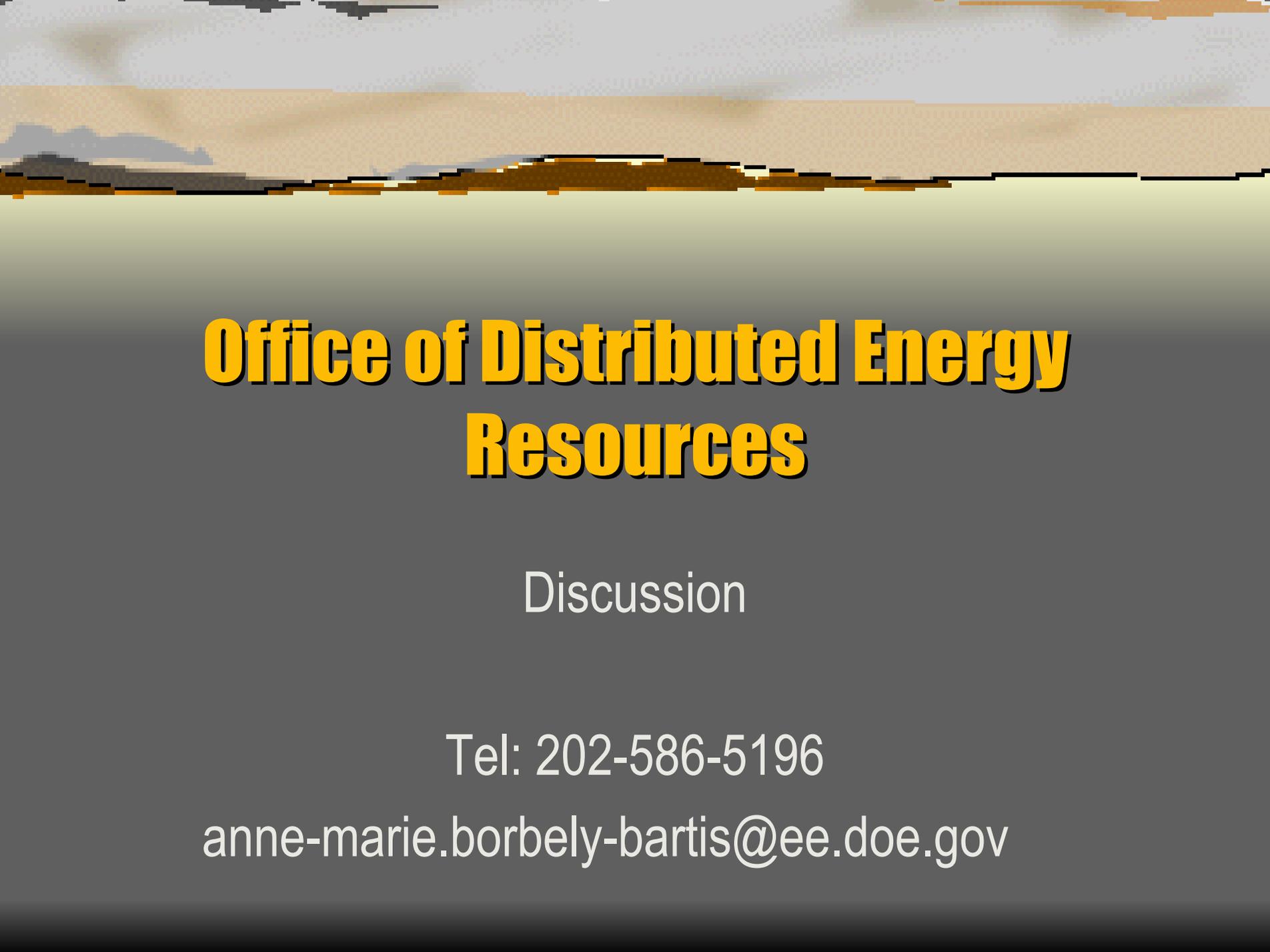
Utility Interconnection Staff

Sample Topics

- ⇒ RTO/ISO communications requirements for demand bidding
- ⇒ Regulatory oversight of “mini-grids” or “power parks”
- ⇒ Real-time pricing
- ⇒ Substation automation, AMR, home gateways, IT
- ⇒ Dis-aggregation of environmental compliance from flat kWh rate, to express value of renewable resources
- ⇒ Management & valuation of intermittent resources (wind, PV)
- ⇒ Building and Fire Code Development
- ⇒ Utility Interconnection

DER Road Show

- ⇒ FY01 – California (San Diego, San Jose, Sacramento); New York (Brooklyn, Long Island); Nevada
- ⇒ FY02 – New York (upstate), Washington, Wisconsin, Oregon, Texas, New Mexico



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Discussion

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